What is Claimed:

1. A strainer self-cleaning method, comprising:

protecting an inlet side of said strainer from projectile debris;

creating a radially inward flow of a fluid in the vicinity of said inlet side of said strainer;

deflecting said radially inward flow of said fluid to flow through said strainer;

generating a localized, radially outward-flow of said fluid in the vicinity of said inlet side said strainer; and,

sweeping said localized, radially outward flow of a fluid over substantially all of said inlet side of said strainer, thereby removing one or more debris particles from said inlet side of said strainer.

2. The method as recited in claim 1, wherein said protecting said inlet side of said strainer includes providing a projectile shield and wherein said deflecting said radially inward flow utilizes a lower surface of said projectile shield and wherein said deflecting said radially inward flow creates a substantially constant speed flow through said strainer, thereby avoiding additional head loss associated with accelerating flow.

3. The method as recited in claim 2 wherein said lower surface of said projectile shield is formed according to the equation

$$\frac{h(r)}{h(r_i)} = \frac{r_i}{r} - \frac{V}{W2h(r_i)}\left(\frac{r_i^2}{r} - r\right)$$

in which h (r) represents the distance between said inlet side of said strainer and an inner surface of said lower surface of said projectile shield, which is a function of radial position; r_i represents a minimum inner radius of said strainer below which there is no fluid flow; R represents an outer radius of said strainer; W represents an approach velocity of said fluid; and V represents said constant flow through said strainer inlet velocity.

4. The method as recited in claim 2 wherein said lower surface of said projectile shield is formed according to the equation

$$\frac{h(r)}{h_i} \sim \frac{\eta r}{2h(r_i)}$$

in which h (r) represents the distance between said inlet side of said strainer and said lower surface of said projectile shield, which is a function of radial position.

5. The method as recited in claim 1 further including generating a localized, reverse flow of said fluid through said strainer and sweeping said localized, reverse flow over substantially all of said strainer, thereby removing one or more debris particles from said strainer.

6. The method as recited in claim 1 wherein said generating a localized, radially outward flow of a fluid and said sweeping said localized, radially outward flow of a fluid over substantially all of said inlet side of said strainer are both accomplished by a suitably shaped, rotating plough.

7. The method as recited in claim 1 further including brushing said inlet side of said strainer.

8. A self-cleaning strainer apparatus, comprising:

a projectile shield situated so as to protect an inlet side of said strainer from projectile debris;

an impeller situated between said projectile shield and said inlet side of said strainer; and

a drive motor attached to said impeller and capable of sweeping said impeller over substantially all of said inlet side of said strainer.

9. The apparatus as recited in claim 8, wherein a lower surface of said projectile shield is shaped to deflect a radially inward flow of a fluid through said strainer at a substantially constant velocity; an upper edge of said impeller is shaped to have a substantially constant clearance gap from said lower surface of said projectile shield ; a lower edge of said impeller is shaped to have a substantially constant clearance gap from said inlet side of said strainer; and said impeller is shaped such that sweeping said impeller over substantially all of said inlet side of said strainer is capable of generating a localized,

radially outward flow of said fluid, thereby removing one or more debris particles from said inlet side of said strainer.

10. The apparatus as recited in claim 9 wherein said lower surface of said projectile shield is formed according to the equation

$$\frac{h(r)}{h(r_i)} = \frac{r_i}{r} - \frac{V}{W2h(r_i)}\left(\frac{r_i^{\ 2}}{r} - r\right)$$

in which h (r) represents the distance between said inlet side of said strainer and an inner surface of said lower surface of said projectile shield, which is a function of radial position; r_i represents a minimum inner radius of said strainer below which there is no fluid flow; R represents an outer radius of said strainer; W represents an approach velocity of said fluid; and V represents said constant flow through said strainer inlet velocity.

11. The apparatus as recited in claim 9 wherein said lower surface of said projectile shield is formed according to the equation

$$\frac{h(r)}{h_i} \sim \frac{\eta r}{2h(r_i)}$$

in which h (r) represents the distance between said inlet side of said strainer and said lower surface of said projectile shield, which is a function of radial position.

12. The apparatus as recited in claim 9 wherein said impeller is shaped such that sweeping said impeller over substantially all of said inlet side of said strainer is further capable of generating a localized, reverse flow of said fluid through said strainer, thereby removing one or more debris particles from said strainer.

13. The apparatus as recited in claim 9 wherein said substantially constant clearance gap between said upper edge of said impeller and said lower surface of said projectile shield

is in the range of zero to ¼ of an inch, and wherein said substantially constant clearance gap between said lower edge of said impeller and said inlet side of said strainer is in the range of zero to ¼ of an inch, and wherein said impeller is swept such that a ratio of the velocity of the impeller tip to said substantially constant velocity of said fluid through said strainer is in the range of 5 to 15.

14. The apparatus as recited in claim 1 further including a brush attached radially opposite to said impeller.

15. A self-cleaning strainer device, comprising:

a projectile shield means situated so as to protect an inlet side of said strainer from projectile debris;

an impeller means situated between said projectile shield and said inlet side of said strainer; and

a drive motor means capable of sweeping said impeller over substantially all of said inlet side of said strainer.

16. The device as recited in claim 15, wherein a lower surface of said projectile shield means is shaped to deflect a radially inward flow of a fluid through said strainer at a substantially constant velocity; said impeller means is shaped such that sweeping said impeller over substantially all of said inlet side of said strainer is capable of generating a localized, radially outward flow of said fluid, thereby removing one or more debris particles from said inlet side of said strainer.

17. The device as recited in claim 16 wherein said lower surface of said projectile shield means is formed according to the equation

$$\frac{h(r)}{h(r_i)} = \frac{r_i}{r} - \frac{V}{W2h(r_i)}\left(\frac{r_i^2}{r} - r\right)$$

in which h (r) represents the distance between said inlet side of said strainer and an inner surface of said lower surface of said projectile shield, which is a function of radial position; r_i represents a minimum inner radius of said strainer below which there is no fluid flow; R represents an outer radius of said strainer; W represents an approach velocity of said fluid; and V represents said constant flow through said strainer inlet velocity.

18. The device as recited in claim 16 wherein said lower surface of said projectile shield means is formed according to the equation

$$\frac{h(r)}{h_i} \sim \frac{\eta r}{2h(r_i)}$$

in which h (r) represents the distance between said inlet side of said strainer and said lower surface of said projectile shield means, which is a function of radial position.

19. The device as recited in claim 16 wherein said impeller means is shaped such that sweeping said impeller over substantially all of said inlet side of said strainer is further capable of generating a localized, reverse flow of said fluid through said strainer, thereby removing one or more debris particles from said strainer.

20. The device as recited in claim 16 wherein a substantially constant clearance gap between said upper edge of said impeller means and said lower surface of said projectile shield means is in the range of zero to ¼ of an inch; a substantially constant clearance gap between said lower edge of said impeller means and said inlet side of said strainer is in the range of zero to ¼ of an inch; and said impeller means is swept such that a ratio of the velocity of the impeller tip to said substantially constant velocity of said fluid through said strainer is in the range of 5 to 15.

21. The device as recited in claim 16 further including a brush means capable of brushing one or more debris particles from said inlet side of said strainer, said brush means being attached radially opposite to said impeller means.